

S.N. Zinatulin
Guidelines on the use of individual inhaler

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The guidance manual describes the main principles of individual simulator inhaler application (“Frolov’s Lungs Training Device”®), model of 2005).

Recommendations were developed with the consideration of the results of research of simulator inhaler application in in-patient, patient care institutions and research centres, including the Russian Scientific Centre of Restorative Medicine and Balneology in Roszdrav, at the Russian State University of Physical Culture, Sport and Tourism, at the Department of Therapeutic Physical Training, Sports Medicine and Physiotherapy at the Moscow State Medical and Stomatological University, in the Novosibirsk Scientific Centre of Clinical and Experimental Medicine.

Guideline recommendations make it possible to determine differentiated programmes for breathing regulation using individual simulator inhaler with consideration of peculiarities of patient’s organism, his adaptive abilities and physiological reserves. Also, the guidance manual describes rules for providing combined aromatherapy using this device, which considerably increases the curative potential of the simulator inhaler.

The material is explained in a simple and easy-to-understand form. This guidance manual can be useful both for those who use the simulator inhaler and for specialists in the area of rehabilitation and prevention, therapeutic physical training, sports and restorative medicine.

Introduction

Breathing is the most important function. The condition of our health and the reserve abilities of our organism depend on it. The complicated system of breathing unites different organs and systems into a continuous process. This process involves lungs as an organ of gas exchange and ventilation as well as the system of blood circulation that provides the transfer of oxygen from the lungs to the cells and transports carbonic dioxide from the cells to the lungs. Scientific research determined that the process of breathing, the utilization of oxygen takes place in cells. That is why one can conditionally distinguish external respiration lungs' ventilation and intracellular, endogenic respiration (chemical reactions with the use of oxygen).

Practically all cells of our organism use oxygen in the metabolic process, so we can say that the whole organism takes part in respiration. That is why respiratory exercises have been used since ancient times in medicine as a remedial measure in cases of diseases of the respiratory apparatus, circulatory and nervous systems, are used to improve metabolism, stimulate physical and mental efficiency, increase physiological organism reserves.

It should be noted that the universal character, safety and ecological compatibility are the most important advantages of the remedial respiration methods. Respiratory exercises can be done by both adults and children, they are safe in case of accurate application, they do not disturb the internal environment of the organism, preserving and improving its ecology. The methods can be combined with any types of treatment and have practically no contra-indications.

A new model of 'Frolov's Lungs Training Device'®, an individual simulator inhaler (ISI), was specially developed with the purpose to help every person to efficiently do respiratory exercises.

During the respiratory session with this inhaler, the organism gets a short hypoxic training session. It is like the person finds himself in the mountains, where, as it is known, there is less oxygen in the air – much like the air the famous, long-living Caucasians breathe in.

As research shows, this type of breathing normalizes blood pressure, improves blood circulation, metabolism, and nervous system condition, slows down aging, and increases energy potential of the organism 2-3 times. Training of respiration with resistance improves lung (s) ventilation and strengthens respiratory muscles which contribute (s) to the successful treatment of bronchopulmonary diseases in adults and children.

Individual simulator inhaler makes it possible to take inhalations with herb decoctions and inhalations with essential oils. ISI structure makes it possible to use several essential oils simultaneously, which considerably increases curative and health-improving effect. Such combination of several functions in one device makes it possible to efficiently combine respiratory exercises and inhalations with essential oils, herbal decoctions, and medical liquors, contributing to successful treatment of chronic diseases.

- License of the Ministry of Industry and Science, RF No. 64/2002-0566-0571 of October 10, 2002
- All rights for the item are protected: RF patent No. 42428 of July 07, 2004
- Registration certificate: No. FC 02012004/0656-04 of October 18, 2004, issued by the Federal Service for Supervision in the sphere of Public Health and Social Development.
- Compliance certificate No. POCC RU.АЯ79. В 55603 of November 11, 2004.

You may send any questions concerning the use of 'Frolov's Lung Training Device'® (ISI) at:
www.zinatulin.ru

1. Function and Principle of Operation

1.1. Function.

Individual simulator inhaler (ISI) was designed to be used for respiratory exercises as well as for inhalations with essential oils and inhalations with herb decoctions.

The simulator inhaler is a medical device and is designed only for individual use.

Individual simulator inhaler is used for treatment, rehabilitation and prevention of different diseases in adults and children (from 5-6 years).

Indications for use: simulator inhaler is used to treat chronic bronchitis, bronchial asthma, vegeto-vascular dystonia (hypo- and hypertensive type), essential hypertension, and angina pectoris. In cases of acute and obstructive bronchitis the device is used during the period of recovery.

The simulator inhaler is used in complex treatment and for rehabilitation in cases of bronchitis, pneumonia, pulmonary tuberculosis, pulmonary emphysema, psychosomatic disorders, after cardiac infarction, strokes, and surgeries. Its application intensifies the action of medicines, improves results and shortens the period of treatment.

The simulator inhaler (ISI) is recommended to generally healthy people and sportsmen as preventive means to train respiratory muscles, to form correct respiratory stereotype, enhance exercise tolerance, improve adaptive capabilities of the organism, increase resistance to unfavourable ecological, industrial factors, weather, and psychological stresses.

Contraindications: acute diseases, bronchial hemorrhages, hemoptysis, respiratory failure of a degree higher than 2, cardiovascular collapse of stage 2A, implanted pacemaker.

Attention

* In the case of chronic diseases, the simulator inhaler is used beyond the acute condition. In the case of exacerbation of a chronic disease, some required treatment should be provided and respiratory exercise using the inhaler can be performed 7-10 days after the acute condition of the chronic disease.

** In the case of acute conditions, such as acute myocardial infarction, acute stroke, acute pyelonephritis, pancreatitis, adnexitis, appendicitis, pneumonia, hepatitis, cholecystitis and other acute diseases, the simulator inhaler should not be used. 2-3 weeks after the patient recovers from the acute con-

dition, a course of respiratory gymnastics with ISI may be started during the stage of recovery.

*** In the case of acute respiratory diseases or the flu, the simulator inhaler can be used for inhalations. After the acute period respiratory exercises with the inhaler are used at the stage of recovery.

**** Respiratory failure of a degree higher than 2, cardiovascular collapse, stage 2A are conditions when the respiration rate achieves 28 per minute and shortness of breath appears even during usual physical activity.

1.2. Principle of operation

* To do respiratory exercises, some pure water is poured into the simulator inhaler. It makes it possible to have respiratory training in the conditions of resistance to breathing during inhalation and exhalation. In such a way, the famous effects in medicine: the RID effect (simulated respiration regulator) and the PPEE effect (positive pressure at the end of exhalation) are used in the process of respiration training. During the exercises for training respiration with resistance, the respiratory muscles are trained and their strength and endurance increase. In addition, the muscles of the bronchi are trained and there is some pneumomassage effect on the bronchi and lungs. In the process of respiratory exercises some air mixture with moderate content of oxygen and a moderate increase in the carbonic acid concentration (hypoxic-hypercapnic gas mixture) is formed in the device, which helps restore normal functioning of the immune system as a result of the developed reactions of activation and training.

The bottom of the internal cup in the simulator inhaler has a step-like form, which makes it possible to easily regulate resistance to breathing with consideration to the age and health condition of the patients.

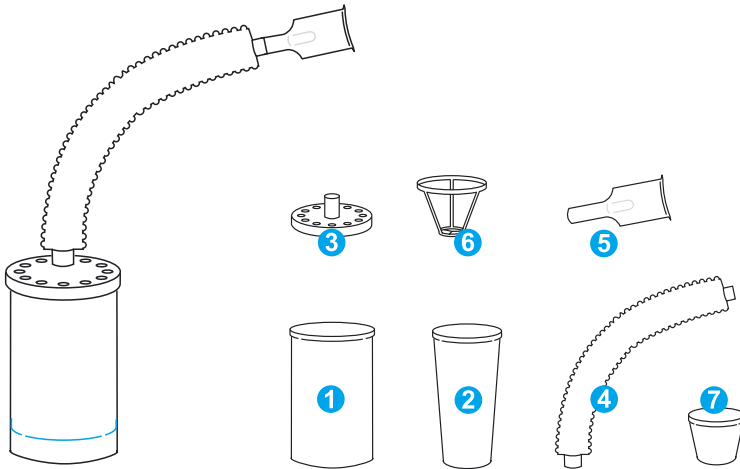
** To perform inhalations with essential oils, a special reservoir is used. It makes it possible to have inhalation simultaneously with three essential oils without mixing them in the solution. Such method of combined aromatherapy considerably increases the efficiency of aromatic oils. The use of essential oils in the process of respiratory exercises facilitates aroma molecule flux to the lungs and to the blood, enhancing the efficiency of respiratory exercises.

*** To have inhalations with essential oils, herb decoction or drug substance, solution is poured into the simulator inhaler.

2. Structure and preparation of the inhaler for operation

The inhaler consists of an external cup (1), internal container (2), cover (3), respiratory tube (4) and a mouthpiece (5). The set also includes a container for essential oils (6) and a graduated jar (7).

Picture 1. Complete Set

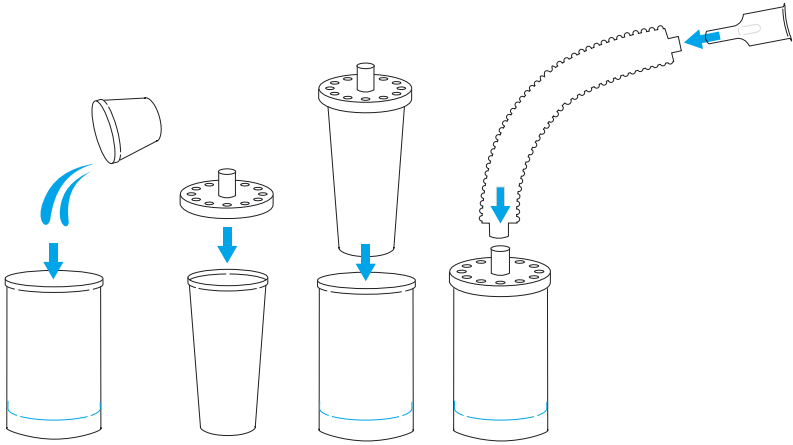


Before the first application and after each training session with the help of the simulator inhaler, it is necessary to take the inhaler apart, clean all parts with warm water and detergent, rinse in running water and dry.

Measure the required water volume using the graduated jar. Pour the water into the inhaler cup. Tighten the cover on the internal container.

Put the internal container into the cup, press the cover in such a way that it tightly covers the cup. Place the respiratory tube on the branch connection of the cover. Insert the mouthpiece into the loose end of the respiratory tube.

Picture 2. Assembly diagram



Attention! There is a container for essential oils in the ISI set. This container is not used during respiratory training exercises or inhalations with herb decoctions (drug substance solutions).

The container for essential oils is used for inhalations with essential oils.

3. Procedure of exercises using the simulator inhaler

3.1. General rules

It is recommended to do respiratory exercises using the simulator inhaler daily, preferably at the same time of day. The treatment course of respiratory exercises using ISI lasts 3-4 months on average. Then the number of sessions can be reduced to 2-3 times a week (prophylaxis programme).

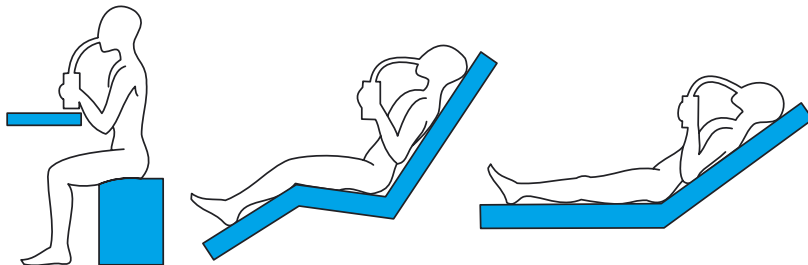
It is recommended to do respiratory exercises using the simulator inhaler in the evening, 2-3 hours after dinner. The best time for exercises is before sleep. In some cases, on an exceptional basis, it is possible to use the simulator inhaler 1-1.5 hours after light supper or in the morning after sleep, on an empty stomach. After dinner, before exercising, you may drink 200-300 ml of water, juice or some other drink. It is not recommended to eat after evening respiratory exercises. It is however preferred that you drink a glass of water.

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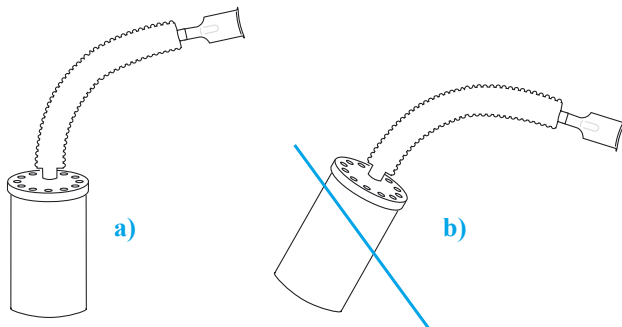
Attention! In the case some person with diabetes, pregnant women or children do the respiratory exercises or if you need to take some medicine before sleep – the person may eat a little portion of food (in accordance with the schedule of taking the medicine).

The position when doing the exercises should be so convenient that you can easily breathe ‘with your stomach’. You can do the exercises while sitting at a table, in an arm-chair (sofa), having leaning back, reclined, or while lying on your side. **Picture 3.**

Picture 3. Positions for exercises with the simulator inhaler



Hold the cup of the simulator inhaler straight vertically during the exercises. Bend the tube as it is convenient for you.



Picture 4. Position of simulator inhaler: a) correct, b) not correct

3.2. Peculiar characteristics of the curative respiration procedure

a) Resistance to respiration: Breathing during the exercises using the simulator inhaler (inhalation and exhalation) is performed through the water, in conditions of resistance to inhalation and exhalation.

b) Extended period of the respiratory act (PRA): PRA is the total time of one respiratory cycle (inhalation and exhalation). It is recommended to gradually increase the time of the respiratory act, by increasing the period of exhalation. During the first days of exercises the PRA is 5-10 seconds. As a result of regular training of breathing, the time of one respiratory cycle gradually increases and can reach 30-40 or more seconds.

c) The period of one session: In the process of exercises the time of the session increases from 5-10 minutes (during the first days) up to 25-30 minutes after 1-1.5 months of training.

d) Water volume: During the course of training while the level of training increases, the volume of water in the simulator inhaler can be increased from 10-18 ml (in the beginning of training) up to 20-30 ml after 1-1.5 months of training.

e) Diaphragmal respiration: It is recommended to have diaphragm respiration (breathing ‘with stomach’) during the exercises using the simulator inhaler.

3.3. Beginning respiratory training

Assemble the simulator inhaler, having poured into it the required volume of pure water at room temperature (see Table 1).

Table 1

Age/state of health	Children and teenagers			Healthy adults, under 60	Healthy adults over 60 and sick adults
	5-7 y/o	8-11 y/o	12-16 y/o		
Volume of water in simulator inhaler, ml	10	12	14-15	18-20	13-15
Duration of exercise, min	5-7	5-7	6-10	8-10	6-10
PRA, s	5-6	5-8	6-10	8-12	6-10

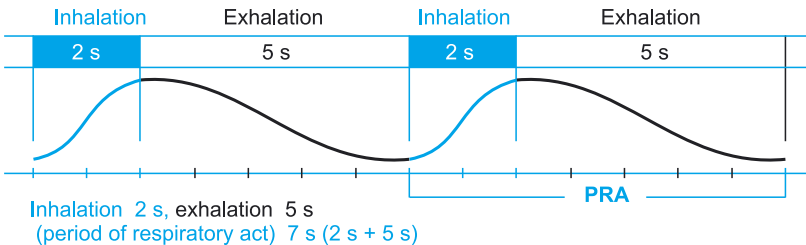
Choose the most convenient position for the body to train respiration. Take a watch with a second hand (a stop-watch) to control the time of exhalation.

You should breathe through the inhaler during training sessions. Inhalation and exhalation is done by the mouth, through the water with resistance. It is necessary to breathe at equal intervals, calmly, keeping an equal duration of the respiratory act (PRA), and rhythm of breathing. The nose does not participate in breathing.

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The length of the first training session should be 5 to 10 minutes. Take the mouthpiece into your mouth, having tightly pressed it with the lips. Take a calm smooth breath with your mouth through the simulator inhaler. After the inhalation, start exhaling through the mouth into the simulator inhaler – smoothly and calmly. Usually during the first days of the training the length of inhalation is 2-3 seconds, the length of exhalation is from 5 to 10 seconds. The sum of the total time of inhalation and exhalation in seconds is the period of the respiratory act – PRA.

Picture 5.



Continue to breathe calmly through the simulator inhaler during the whole training session: inhalation for 2-3 seconds and a prolonged exhalation. Control exhalation time according to the watch. We would like to once again draw your attention to the fact that it is necessary to learn to breathe evenly, exhale calmly, slowly, and without a strain.

Determine the length of exhalation when you breathe without a strain, for example, 5 seconds, and try to do exercises during the session with this PRA. During the first three-four days perform only such simple respiratory exercises. It is required to learn to control breathing and manage it. During these days the period of training sessions should be 5-10 minutes. It is not recommended to increase the volume of the water, PRA or the length of the respiratory act.

ATTENTION!

For children with bronchial asthma, obstructive bronchitis, vegeto-vascular dystonia and for adults with bronchial asthma, obstructive bronchitis, arrhythmia, lung emphysema, multiple bronchiectasis, after myocardial infarction, stroke, pneumonia, pleurisy, after chest or abdominal cavity organ surgeries, it is recommended to perform inhalation through the nose and exhalation through the simulator inhaler during the first 2-3 weeks. Then the training should be continued in the general mode – inhalation and exhalation with the mouth through the simulator inhaler.

3.4 The main course of respiratory exercises

Respiratory exercises should be done daily. In the process of training the time of training sessions as well as PRA (period of respiratory act) should be gradually increased. Also, to improve the effect, it is necessary to gradually increase the volume of water in the simulator inhaler (resistance to breathing).

Table 2.

STARTING EXERCISES				BASIC COURSE OF TRAINING			
Age, years	Water, ml	Duration, min	PRA, s		Water, ml	Duration, min	PRA, s
5-7	10	5-7	5- 6		12-14	12-15	9-10
8-11	12	5-7	5- 8		15-18	15-20	10-15
12-16	14-15	6-10	6-10		18-20	15-20	12-20
Sick adults, adults over 60	14-15	6-10	6-10		20-25	20-25	20-30
Healthy adults under 60	18-20	8-10	8-12		25-30	25-30	30-40

* **Attention!** In the process of training only the length of exhalation should increase. The length of inhalation remains the same (2-3 seconds).

* Sportsmen and people who regularly do physical exercises, start breathing with the simulator inhaler with 22-25 ml of water, with PRA of 20-25 seconds and train during the first week for 15-20 minutes.

In the process of training, parameters of training are also gradually increased. When performing the main course of training, they may pour 35-40 ml of water into the simulator inhaler, and breathe for 30-35 minutes. PRA of trained people can achieve 50-60 seconds or more.

Usually, during the first week the organism adjusts to the new respiratory conditions and then, starting from the second week of training, the parameters of training can be gradually increased.

In the process of training, the water volume in the simulator inhaler can be increased by 1 ml every 3-4 days, PRA – by 1 second every 2-3 days, and the length of the training session – by 1 minute every 2-3 days.

A more gradual increasing of training factors (PRA, water volume in the simulator inhaler and the time of the training session) is possible too. For example, if respiration with 20 ml of water in the simulator inhaler causes

health, it is necessary to regularly do respiratory exercises by training 2-3 times a week. It is not recommended to interrupt training for a long time (for a month or more). If the organism does not get training load for a long time, its reserves reduce, its tolerance decreases, and the state of health becomes worse.

Preventive exercises should be done with training parameters optimal for your organism (water volume, PRA, length of training sessions). It is recommended to keep a journal and record training indices and make notes about the state of your health. In the process of curative and preventive respiratory courses you can efficiently use aromatic essential oils of different varieties from the ‘Aromas of Good Health’ series to improve stamina and activity of some systems.

3.6 Additional recommendations

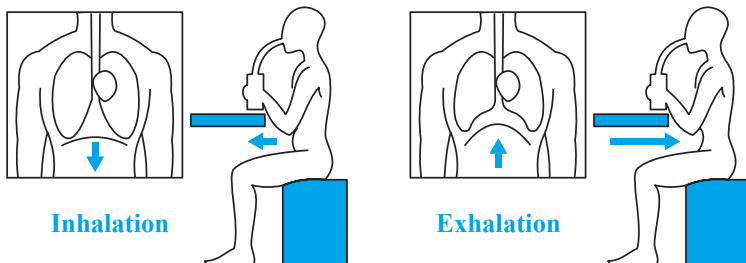
1. In the case there are diseases of respiratory apparatus or acute catarrhal diseases, you may efficiently use the device to do inhalations with essential oils and with herb decoctions.

2. It is recommended to record results of the training in a journal listing conditions of training, pulse rate per 1 minute before and after the training with the simulator inhaler, and if required – blood pressure, state of health, additional medications and results of examination.

3. In the case of chronic diseases or the prescription of additional medications, you should undergo examination by specialists regularly and reduce the doses of the medications you take.

4. One of the important conditions for efficient training using the simulator inhaler is correct diaphragm respiration. Correct diaphragm respiration means that during the inhalation the stomach moves forward, during the exhalation it is drawn in.

Picture 7



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If you can't breathe correctly with your diaphragm in the beginning of training, do exercises in the breathing mode that is usual for you, but nevertheless find some time for special exercises with diaphragm respiration. Be sure to perform diaphragm respiration (breathing 'with stomach') when exercising with the simulator inhaler and try to breathe like that during the day.

Diaphragm respiration enhances the efficiency of respiratory exercises, considerably improves blood circulation, movement of lymph that cleans internal organs, and provides a massaging effect on the organs of the abdominal cavity (liver, gall bladder, stomach, pancreas, intestines, kidneys, prostate gland and other organs).

5. Special attention during training should be paid to breathing which should be smooth, calm, without a strain, and without any jerks of the stomach.

6. Find a position of the body in which you can breathe using the simulator inhaler calmly and easily.

7. Pay careful attention to what you eat. If metabolism improves, the appetite may improve too, the organism may require increased consumption of some specific types of food products. In the case of adiposity the appetite may considerably decrease, which contributes to successful use of the available fat resources.

Table 3. Example of a Journal

Date	Duration, min	Water, ml	PRA, s	Pulse before and after	Notes
23.06.2006	20	25	25	76 / 68	Blood pressure has been 160-170 per 95 for the whole week, I feel well, the bowels work better.

ATTENTION! I

In cases of chronic disease, respiratory exercises are done during the period of remission that is beyond the acute stage.

If a chronic disease becomes acute, it is required to stop respiratory exercises undergo special treatment in a hospital, and 5-7 days after the end of the treatment you can resume respiratory exercises using the simulator inhaler.

4. Inhalations with essential oils

4.1 General aspects

Individual simulator inhaler can be used for inhalations with essential oils. It is known that aromatic essential oils produce additional benefits for the organism. During inhalations, molecules of the oils have a local effect, which makes it possible to efficiently use them for the treatment of various diseases of the respiratory apparatus, for the prevention of acute respiratory disease, flu, diseases of the bronchi and lungs, for the rehabilitation of patients after pneumonia, tuberculosis, and lung surgeries.

In addition, essential oil molecules produce a specific effect on various organs and tissues and on the whole organism in general. That is why inhalations with aromatic essential oils can be used both in addition to respiratory exercises and as an independent method of treatment, rehabilitation and prevention, to improve immunity, metabolism and the state of the nervous system.

For this purpose, one essential oil can be used, but according to research, the use of several essential oils is more efficient and makes it possible to get the desired effect more quickly. The simulator inhaler has a special container for essential oils. Choose the necessary essential oils with the help of a specialist.

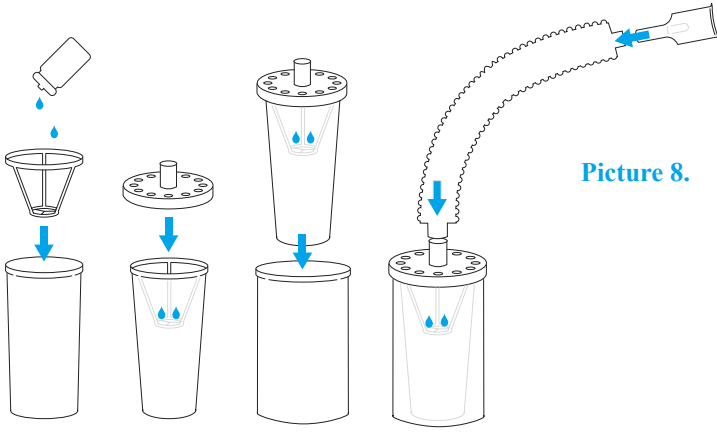
4.2 Preliminary operations, cold inhalations

Put the container for essential oils into the internal container. Put 1-2 drops of the chosen essential oil into the cell of the container. Put the cover on the internal container. Place the internal container into the cup of the simulator inhaler and tighten the cover on the cup. Place the respiratory tube on the cover branch piece. Insert the mouthpiece into the respiratory tube.

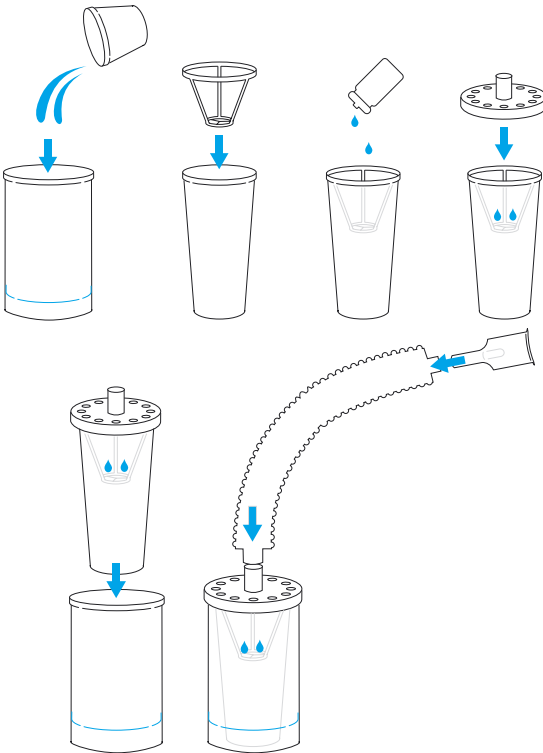
Picture 8.

4.3 Preliminary operations, hot inhalations

Pour the required volume of water at 70-80°C into the cup (see Table 1 on page 11). Put the container for essential oils into the internal container. Put 1-2 drops of the chosen essential oil into the cell of the container. Put the cover on the internal container. Place the internal container into the cup of the simulator inhaler and tighten the cover on the cup. Place the respiratory tube on the cover branch piece. Insert the mouthpiece into the respiratory tube. **Picture 9.**



Picture 8.

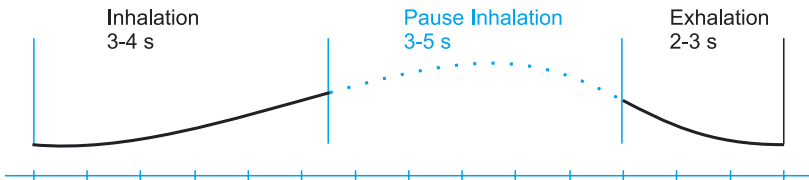


Picture 9.

4.4 Inhalation procedure

Place the inhaler on a table, or some other base. Bend your head a little and take the mouthpiece into your mouth. Take smooth, slow, calm breaths through the mouth during inhalations. Make a pause after an inhalation, hold your breath and then breathe out calmly through your mouth into the inhaler. It is recommended to breathe in for 3-5 seconds, making a pause after the inhalation for 3-5 seconds, and breathe out through your mouth into the inhaler for 2-3 seconds.

Picture 10.



The length of inhalation with aromatic oils is 8 to 10 minutes. In the case of good tolerance to the inhalations, the number of essential oil drops during inhalations may be gradually increased to 2-3 drops (1 drop more every 4-6 days). Inhalations can be taken once or twice a day, preferably 2-3 hours after meals. It is recommended not to go out for 30-40 minutes after an inhalation session (during the cold season of the year – for 1-1.5 hours). The number of inhalation sessions per 1 course – 15-20 (once a day), 20 (twice a day)/.

If inhalations with one type of essential oil are tolerated well, you can try inhalations with two or three types of essential oils. Each of the oils is poured into a separate cell of the essential oil container so that the oils do not mix in the solution.

It is recommended to perform diaphragm respiration during the inhalations. In the case of coryza, inflammation of paranasal sinus (maxillary sinusitis, frontal sinusitis), you can breathe out through your nose. In the case some sputum and mucus is discharged as a result of inhalations, stop the inhalation session, clear your throat and rinse your mouth. Then continue the inhalation.

* After the inhalation, take the device apart, clean its parts with water and cleaning solution, and dry.

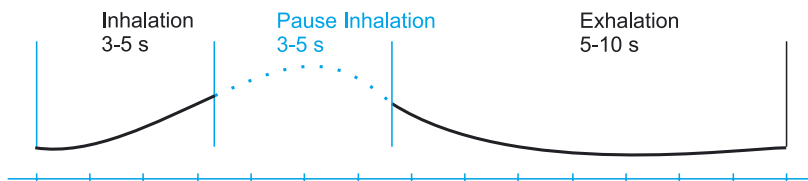
5. Respiratory exercises in combination with essential oil inhalations

Pour the required water volume into the cup (see Table 1 on page 11). Place the container for essential oils into the internal container. Put 1-2 drops of the chosen essential oil into the cell of the container. Put the cover on the internal container. Place the internal container into the cup of the simulator inhaler and tighten the cover on the cup. Place the respiratory tube on the cover branch piece. Insert the mouthpiece into the respiratory tube.

When doing respiratory exercises in combination with essential oil inhalations, it is recommended to take a smooth breath through the mouth for 3-5 seconds. Having breathed in, make a pause for 3-5 seconds and slowly breathe out through the mouth into the simulator inhaler, through the water for 5-10 seconds. It is recommended to perform diaphragm respiration (see page 15).

* After the inhalation take the device apart, clean its parts with water and cleaning solution, and dry.

Picture 11.



6. Technical maintenance and storage precautions

Before the first use and then after each inhalation session take apart the simulator inhaler, clean its parts with warm water and cleaning solution (soap, baking soda), rinse and dry.

If required, all parts of the simulator inhaler should be sterilized for 30 minutes with superoxol with 0.5% of cleaning solution at 18-24°C.

Never use the simulator inhaler if the colour of the plastic changes or if there are cracks or other defects that make it unusable. Keep the simulator inhaler in a plastic bag of polyethylene film or in a carton box at room temperature.